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Device with two movable holders for playing back optical video disks or video CDs,

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Background of the Invention

Optical digital video disks or video CDs (VCD) are becoming increasingly more popular. Since a single VCD conventionally offers storage space for approximately 70 minutes of playing time, it is not sufficient for the complete playback of a conventional movie, so that often two holders for a single playback device are provided, in which the VCDs are placed such that, after the playback of the one VCD, the second VCD can be started immediately following it, if the playback head is swivelled from the one holder to the other.

So-called dual devices for playing VCDs are already offered on the market, which have a relatively complicated arrangement for receiving two VCDs. Most frequently, two drawers for receiving the VCDs are used, which can be pulled out and slid in again in the horizontal direction independently of one another and are disposed next to one another. However, this arrangement requires guide rails and movement mechanisms on both sides of a holder with the entire associated complicated structure.

Summary of the Invention

The object of the present invention is providing a device for playing back optical video disks or video CDs with two movable holders, which is simple of structure and therefore less expensive to manufacture.

To solve this task the invention proposes according to that the holders have the shape of a quadrant, that they are disposed symmetrically with respect to an imagined

horizontal center axis through the device, with the axis penetrating the front wall and the rear wall, and the holders are disposed swivellably on a common stationary swivel axle, which is disposed between them substantially perpendicularly in the device housing. Each holder is provided with a toothed extension section. Gearing configurations are provided on both sides of the holders such that these come to mesh with toothings on the arcuate margins of the holder and thereby swivel the holders about the common axis and specifically out of the playback device, in order to emplace a VCD into the holder or remove it, and again back into the playback device.

Brief Description of the Drawing

Figure 1 shows a perspective view of the structure according to the invention,

Figure 2 shows a top view onto the two holders in the playback position,

Figure 3 shows a top view onto the two holders of which one is swilled out of the device,

Figure 4 a partial view of the playback head movably disposed in the device, and

Figure 5A and 5B different views of the mechanism for moving the playback head in the vertical direction.

As evident in Figures 1, 2 and 3, the present invention relates to the disposition of the holders for VCDs in a device for playing back optical digital video disks or video CDs (also referred to as VCD player). This VCD player comprises a housing 1, two holders 2 in the upper portion of the housing 1 for receiving the VCDs, a playback head 3, which is disposed in a lower portion of the housing 1, two gearing arrangements 4 for driving the two holders 2, as well as the customary electronic

control systems distributed in the housing 1. By 11 is denoted an upper cover, which can additionally be provided with a (not shown) decorative cover, and which are provided above the holders for the upper covering of housing 1.

The two holders 2 for the VCDs are disposed symmetrically with respect to an imagined axis horizontally extending centrally through the housing and penetrating the front wall and the rear wall. The two holders 2 have substantially the form of a quadrant, i.e. of a quarter-circle. Each holder 2 is provided with an arm 21, disposed in the proximity of the one end of a quarter-circle, with the free end of the arm 21 extending up to the imagined center of a circle encompassing the quadrant. The two ends of both arms 21 overlap such that the two holders 2 can swivel independently of one another about a common swivel axle 22 and thereby can substantially swivel in a substantially horizontal plane out of housing 1 and can swivel back into this housing for the purpose of placing or removing a VCD into or from the holder 2.

To dampen the movement during the swivelling of the holder 2 with respect to the housing 1, at suitable locations of the inside of the housing 1 bumpers 12 can be provided, which serve as additional guidances for the holders 2.

With the formation according to the invention the symmetrically disposed holders 2 can be swivelled independently of one another about the common swivel axle 22 out of the housing 1 and back into it. The guidance arrangements for such swivellable holders 2 are considerably simpler in structure than those for the conventional holders which are moved in the manner of drawers, which must be pulled out and slid back in again.

Each holder 2 has in the proximity of its center section a throughlet opening 23, through which the playback head can be moved upwardly in the direction of the emplaced VCD to the position, in which the playback of the VCD sets in.

Each holder 2 further comprises at least along a portion of the quadrant-form edge a tothing 24, which engages a toothed wheel 41 of a driving arrangement 4, which ensures that when the driving arrangement 4 is switched on, the holder 2 is swivelled about the swivel axle 22 through the engagement of tothing 24 and toothed wheel 41, and therewith is rotated relative to the housing 1. In order to swivel the complete quadrant-form holder 2 out of the housing 1, an extension section 25 of sufficient length is secured on the end of the one holder 2 facing the other holder 2.

The tothing 24 extends also over the entire length of the extension section 25 such that when the toothed wheel 41 of the driving arrangement 4 engages the tothing at the end of the extension section 25, the holder 2 can be swivelled completely out of the housing 1. Since the two holders 2 are disposed next to each other, the extension sections 25 of the two holders 2 are formed such that they overlap when the two holders 2 are swivelled into the housing 1. Figure 1 shows this structure especially clearly.

The two driving arrangements 4 disposed independently of one another on the insides of the housing 1 are actuated via suitable electronic circuits and switches. The driving arrangement 4 comprises essentially a motor and a number of toothed wheels. Through the engagement of the toothed wheel 41 of the driving arrangement 4 of the tothing 24 of the holder 2 the latter can be continuously and gently swivelled about the swivel axle 22 relative to the housing 1.

Although the housing 1 has two holders 2, only a single playback head 3 is required. This playback head with its suspension is provided in the lower portion of housing 1 and is driven by suitable electronic circuits, such that it moves beneath and between the two holders 2. If the playback head 3 is displaced beneath one of the two holders 2, it is raised to a position in which the playback process starts. This control of a playback head 3 is prior art and not essential to the invention. However, it is here mentioned for the purpose of documenting that the two quadrant-form holders

according to the invention can be applied in combination with the conventional playback techniques.

In Figures 4 and 5A as well as 5B the entire playback head 3 with its suspension is disposed in a movable housing 31. Apart from an electronic arrangement 32 for the playback process itself, a driving motor 33 and a gearing 34 is accommodated in the head 33. The entire playback head 3 is driven electronically. Housing 1 comprises at its inner face of the front wall a toothing 13, which meshes with a driving pinion 341 of gearing 34. When the driving pinion 341 moves along the toothing 13 in housing 1, the housing 31 is also moved along toothing 13. When the driving pinion 341 reaches one of the two ends of the toothing 13, the housing 31 is located exactly beneath one of the two holders 2 at a predetermined site. By actuation of the driving motor 33 through a suitable electronic circuit in the clockwise direction according to Figure 4, the driving pinion 341 of gearing 34 in the housing 31 rotates in the opposite direction and accordingly moves the toothing 13 in the direction toward the left. A first toothed wheel 342 of gearing 34 meshes with the driving pinion 341 and comprises an untoothed section 343 extending along its circumference. If the driving pinion 341 rotates in the toothing 13 in housing 1 and reaches the left end of toothing 13, it contacts simultaneously the untoothed section 343 of the first toothed wheel 342.

At this point in time the second toothed wheel 342 ceases its rotational movement and no longer drives the driving pinion 341. A small toothed wheel 344 beneath and coaxially with respect to the first toothed wheel 342, which is provided with a special section, which has some teeth (i.e. that the small toothed wheel 344 is not provided along its entire circumference with a toothing) at this point in time engages with the few teeth a second secondary wheel 345. A shaft butt 346 beneath and coaxially with respect to the second secondary wheel 340 comprises along its outer edge an undulatory groove 347.

A holding arm 35 of the playback head 3 extends on its backside and thereby engages the undulatory groove 347 such that if the shaft butt 346 is rotated, the holding arm 35 is guided through the groove 347 in the direction in the upward or downward direction. When the toothed wheel 341 reaches one of the two ends of the tothing 13 in housing 1, the holding arm 34 is moved toward the upper side of the undulatory groove 347 such that the playback head 3 can move upwardly for playing back a VCD emplaced in the holder 2.

This means that the groove 347 acts like a cam in order to move the holding arm 35 upwardly and downwardly. If the driving motor 33 rotates in the opposite direction, all of the above described structural parts also execute opposite movements. If the toothed wheel 341 travels to the right end of the tothing 13 of housing 1, the playback head 3 repeats its playback function. The playback head 3, the drive 33 and the gearing 34 consequently cooperate with the other structural parts of the device for playing back VCDs under the exact control by electronic circuits in order to ensure the desired playback properties.

Claims

1. Device for playing back optical video disks or digital video CDs with two movable holders, characterized in that the holders have the shape of a quadrant, that they are disposed symmetrically with respect to an imagined horizontal center axis of the device, which axis penetrates the front wall and the back wall, in the upper portion of the device housing, such that each of them can receive an optical video disk or a digital video CD, that the two holders are swivellably disposed on a common stationary swivel axle, which is disposed between them substantially perpendicularly to the housing, that each holder comprises an extension section at the end facing the other holder of the quadrant-form edge and that the two arcuate edges comprise at least over a portion of their length a toothing, which extends up to the free end of the extension section.
2. Device as claimed in claim 1, characterized in that driving arrangement are provided on the two insides of the device housing such that the quadrant-form holders can be swivelled in this way independently of one another about the common swivel axle in order to be swivelled out of or into the housing through the engagement of the toothing at the arcuate edges of the holders of corresponding toothed wheels of the driving arrangement.